ADVANCED PHARMACOLOGY FOR NURSE PRACTITIONERS
GSN0606

Clinical Correlation -
Chronic Asthma Case Study
Cassandra Martin
February 8, 2000

Definition

- The National Heart, Lung, and Blood Institute (NHLBI) define asthma as a chronic inflammatory disorder of the airways in which there is interaction among inflammatory cells, mediators and the cells and tissues in the airways. This inflammatory response results in chronic airway hyper- responsiveness to stimuli/triggers.

Asthma Triggers

- Allergens - domestic dust mites, pollens, molds, cockroaches, animals with fur
- Chemicals or airborne irritants in the workplace
- Tobacco smoke
- Physical activity
- Extreme emotional expressions (laughing or crying hard)
- Cold air or weather changes
- Viral respiratory infections
- ASA
- Food additives

APPROACH TO PATIENT HISTORY

Symptoms of Uncontrolled Asthma

- Recurrent wheeze
- Recurrent chest tightness
- Recurrent dyspnea
- Cough, particularly at night and in early hours of morning
- Symptoms occur or worsen at night, awakening patient
- Symptoms occur or worsen in the presence of triggers
- Reversible and variable airflow limitation (measured with a peak expiratory flow(PEF)meter).

APPROACH TO PATIENT

Physical Examination

Asthma symptoms vary throughout the day, therefore, the patient's respiratory status may appear normal during the physical examination.

If a patient is experiencing symptoms, assess for the following:

General: tachypnea, tachycardia

Respiratory: adequacy of aerations, symmetry of breath sounds, wheezing

ENT/skin: evidence of allergic nasal, sinus or skin

APPROACH TO PATIENT

Laboratory

- Forced expiratory volume (FEVI) - the forced volume of air that can be expired in one second.
- FEVI is the best single measure of lung function for assessing asthma severity.
- Peak expiratory flow rate (PEFR) - the fastest rate at which air can move through the airways during a forced expiration.
- There is a close correlation between the PEFR and the FEVI.

CASE STUDY QUESTION

What objective and subjective data support the assessment of poorly controlled asthma in this patient?

Objective	Subjective
➢ diffuse wheezing bilaterally	➢ Chest tightness over the past 3 days ➢ Cough ➢ asthma symptoms that awakened him

CASE STUDY QUESTION

What factors may be contributing to this problem?

- Noncompliance with the prescribed anti-inflammatory agent, triamcinolone
- Overuse of the bronchodilator, albuterol
- Viral infection (Mr. T presented complaining of a sore throat)
- Seasonal allergen (pollens)
- Possible indoor allergen in the carpet or furniture or indoor mold

CASE STUDY QUESTION

What non-pharmacologic treatment should be reviewed with the patient?

- Avoidance of triggers

STEPS PATIENTS CAN TAKE TO REMOVE TRIGGERS FROM ENVIRONMENT

- *Dust mites* - wash bed linens and blankets once a week in hot water, dry thoroughly in hot dryer or the sun. Use of airtight covers on mattresses and pillows to prevent mites from living in them. Remove carpets, especially in bedrooms. Avoid fabric-covered furniture.
- *Animal allergens* - Remove animal from home, or at least bedroom. If animal cannot be removed from home, give him a bath weekly.
- *Avoid tobacco*.
- *Cockroach* - Pesticide use, if sprays used, asthma patient should not be home during spraying, air out home before the patient returns and clean home often.
- *Mold and Pollens* - Remain indoors when pollen and mold counts are high, close windows and doors. Air conditioning beneficial if internal and external parts kept clean.
- *Viral Respiratory Infections* - Annual influenza vaccine. At the first sign of a cold, the patient's practitioner should:
    1. Treat with an inhaled short acting B2 agonist
    2. Begin treatment with corticosteroid tablets or syrup or
    3. Increase inhaled corticosteroids
- *Physical Activity* - The most effective approach to preventing exercise induced asthma is pretreatment with a short acting inhaled B2 agonist or cromoglycate before exercising. Training and warming up also alleviates symptoms.
- *ASA* - Do not take asthma if it causes asthma

CASE STUDY QUESTION #2

What are the goals for asthma control in this patient?

- Minimal or no chronic symptoms
- Reduce the need for prn B2 agonist
- PEF variability < 20%
- Reduce episodes
- No limitations on activities
- Minimal adverse effects from medications

STUDY QUESTION

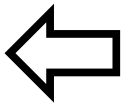
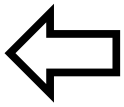
What Pharmacotherapeutic alternatives are available for the treatment of this patient?

- The NHLBI recommends a stepwise approach to treatment of the asthma patient. This approach begins with classification of the severity of the patient's condition according to a severity scale. Mr. T, patient in case study, would be categorized on the severity scale as level 3. The next step is to begin treatment at the step most appropriate to the level of asthma severity, step 3 for Mr. T. Based on level of control of Mr. T's asthma the number and frequency of Mr. T's medications will be adjusted as per protocol (step up or step down).

SEVERITY SCALE

	SYMPTOMS	NIGHTTIME SYMPTOMS	PEF
STEP 4 **Severe Persistent**	Continuous Limited	Frequent	<=60% predicted Variability >30%
STEP 3 **Moderate Persistent**	Daily Use B2-agonist daily. Attacks effect activity	>1 time a week	>60% - <80% predicted Variability >30%
STEP 2 **Mild Persistent**	> = 1 time a week but < 1 time a day	>2 times a month	> = 80% predicted Variability 20 - 30%
STEP 1 **Intermittent**	<1 time a week Asymptomatic and normal PEF between attacks	> = 2times a month	> = 80% predicted Variability < 20%

TREATMENT		
	Long Term Preventative	**Quick-Relief**
STEP 4 **Severe Persistent**	**Daily medications**: ➢ **Inhaled corticosteroid**, 800-2,000 mcg or more, and ➢ Long-acting bronchodilator: either **long-acting inhaled B2-agonist**, and/or sustained-release theophylline, and/or long-acting B2 agonist tablets or syrup, and ➢ Corticosteroid tablets or syrup long term.	➢ Short-acting bronchodilator: **inhaled B2-agonist** as needed for symptoms
STEP 3 **Moderate Persistent**	**Daily medications:** ➢ **Inhaled corticosteroid**, > = 500 mcg and, if needed ➢ Long-acting bronchodilator: either **long-acting inhaled B2-agonist**, sustained-release theophylline, or long-acting B2-agonist may provide more effective symptom control when added to low-medium dose steroid compared to increasing the steroid dose). ➢ Consider adding antileukotriene, especially for aspirin-sensetive patients and for preventing exercise- induced bronchospasm.	➢ Short-acting bronchodilator: **inhaled B2-agonist** as needed for symptoms, not to exceed 3-4 times in one day.
STEP 2 **Mild Persistent**	**Daily medications:** ➢ Either **inhaled corticosteroid**, 200-500 mcg, cromoglycate, nedocromil, or sustained-release theophylline. Antileukotrienes may be considered, but their position in therapy has not been fully established.	➢ Short-acting bronchodilator: **inhaled B2-agonist** as needed for symptoms, not to exceed 3-4 times in one day.

STEP 1 **Intermittent**	➢ None needed.	➢ Short-acting bronchodilator: **inhaled B2-agonist** as needed for symptoms, but less than once a week ➢ Intensity of treatment will depend on severity of attack (see figures on management of asthma attacks ➢ Inhaled B2-agonist or cromoglycate before exercise or exposure to allergen.
Stepdown  Review treatment every 3 to 6 months. If control is sustained for at least 3 months, a gradual stepwise reduction in treatment may be possible.		Stepup  If control is not achieved consider stepup. But first: review patient medication technique, compliance, and environmental control (avoidance of allergens or other trigger factors).

CASE STUDY QUESTION

What strategies should be employed to improve control of this patient's asthma?

- Consult asthma specialist
- Selection of appropriate medications
- Address non-compliance with anti-inflammatory agent, triamcinolone inhaler (inhaled corticosteroids are the most effective long-term preventative medications)
- Identification of and avoidance of triggers
- Monitoring prescribed therapeutic regimen and patient at regular intervals (Q 3 to 6 months once asthma is under control)

➢

"CONSULTING AN ASTHMA SPECIALIST ACCORDING TO THE NHLBI (1995)

CASE STUDY QUESTION

What assessments should be made when he returns in several weeks for reevaluation?

- PEFR
- Review of symptoms

OTHER QUESTIONS FOR MONITORING ASTHMA CARE

Ask the patient:		**Action to Consider:**
Has your asthma awakened you at night? Are you participating in your usual physical activities? Have you needed more quick-relief medications than usual? Have you needed any urgent medical care? Has your peak flow been below your personal best?		Adjust medications and management plan as needed (step up or step down). But first, compliance should be assessed.

CASE STUDY QUESTION

What information should be provided to the patient about his asthma therapy?

The patient needs information that prepares him to make daily decisions required to prevent/control his asthma symptoms.

He should be instructed on:

- the name, dose and frequency of his prescribed long-

	_____ _____ _____ _____ _____ _____ _____

Zone 3 *Your asthma is getting severe if:* ➢ Your peak flow readings have fallen to between _____ and _____ ➢ You are increasingly getting breathless ➢ You are needing to use you _____ (relief inhaler) every _____ hours or more often	**Action** *Ring your doctor or nurse* ➢ Take _____ prednisolone tablets (_____mgs each) and then _____ _____ ➢ Discuss with your doctor how to stop taking ➢ Continue to take your _____ (reliever inhaler) as required
Zone 4 *Medical alert/emergency if:* ➢ Your peak flow readings have fallen to below _____ ➢ You continue to get worse _____ (reliever inhaler) more than usual	**Action** *Get help immediately* ➢ Ring your doctor immediately (Telephone _____) or call an ambulance ➢ Continue to take your _____ (reliever inhaler) as needed. **Do not be afraid of causing a fuss. Your doctor will want to see you urgently.**

PATIENT INSTRUCTIONS

The patient should be given the following information on use of a peak flow meter.

1. Attach a disposable mouthpiece to the peak flow meter.
2. Stand, hold the peak flow meter horizontally without restricting movement of the marker.
3. Take a deep breath in, seal lips around mouthpiece, then breath out as fast as possible.
4. Record the results. Repeat steps 2, 3, ad 4 two more times, record the highest of the 3 readings as the PFR.

*Demonstrate procedure, provide illustrated instructions, and assess patient's technique at every visit.

PATIENT INSTRUCTIONS CONT.

The patient should be instructed on use of inhalant